Density has been considered a suitable parameter to define wood quality. However for some end uses it does not represent the quality grades. For instance, for structural applications, it is more adequate to have a grade of wood quality based in terms of strength and stiffness.

In this work, both density and stiffness were proposed as indices for assessing wood quality of maritime pine for structural timber. The transverse elastic properties of both early and latewood and their spatial variability were determined in 750 specimens taken from five trees, aged from 60 to 68 year-old, harvested in Portugal central region.

X-ray microdensitometry measurements were carried out to assess the local density of wood, as well as the respective dimensions and fractions of the earlywood and the latewood layers within the growth rings.

Tensile tests at the growth ring scale were carried out. Specimens with nominal dimensions of 50(R)x5(T)x2(L) (mm) were tested on an Instron 5848 Microtester machine under a displacement rate of 0.2 mm/min. These tests were coupled with digital image correlation technique for assessing strain fields across the region of interest. Images were recorded by means of an 8-bit Baumer Optronic FWX20 camera (1624x1236 pixels, pixel size of 4.4 µm) coupled with a telecentric lens TC 2309.

With this study, it is intended to develop methodologies for quantifying the variability of maritime pine wood within the stem. Assessing this spatial information can be of major importance for wood modelling and end-user applications.

Keywords: Wood quality, density, transverse elastic properties; earlywood; latewood; variability; maritime pine.

OP236

Inter- / Inside-tree Variations of Reference Wood Characteristics of High Value-Added Central African Timber Species

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The Central African wood sector is characterised by a steady but sometime short-lived commercialisation of new timber species on the local market as well as for regional or international trading. Wood manufacturers must identify the most suited species according to their own processing constraints in relationship with the specific wood properties of the selected species. According to these operators, wood variations quite only correspond to differences between species.

However, important variations of physical and mechanical properties are observed on sawn timber, leading to bitter technological problems during processing. Some reference characteristics currently used to qualify technological behaviour of tropical species have been determined according to international standards or specific CIRAD's standard sampling procedure.

The analysis of the variations of some of these properties (shrinkages, fibre saturation point, hardness, Young's modulus) brought out the respective effect of several factors: basically, type of botanical species, but also differences between trees (linked to any diameter and age effect, even if very often, trees age is not known), and variations inside trees.

Inter-species variations are frequently very high, but for some Central African timbers (i.e. Cylicodiscus gabunensis / OKAN, Pterocarpus soyauxii / PADOUK, Staudtia stipitata / NIOVE), intra-species variations can be higher. In particular, it is usually considered that intra-trees variations have not to be taken into account for timber from natural forest, and only concern plantations species. However, high variations inside trees have been observed for some species explaining some technological problems occurring during processing.

These results shown that the study procedures to qualify tropical woods from plantations in one hand, and tropical woods from natural forests in the other hand, can be quite similar in some cases. Intra-species wood variations of timber from natural forest must be taken into account to improve appropriateness between their quality and their potential utilisation.

Keywords: Tropical wood; Central Africa; Wood Variability; Shrinkages; Fibre Saturation Point, Hardness, Young's modulus

OP237

Efficiency of pruning and thinning for three different eucalypt species managed for high value wood production

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Partially future demand of valuable hardwoods can be covered by plantation grown hardwoods with management dedicated to high quality sawlog production. Due to specific self-pruning of the genus Eucalyptus, high quality in short rotation plantations with relatively low target diameter can only be reached by implementing intense pruning strategies. The quality of wood products based on eucalypts at the world market is promising and might be judged as to be similar or superior to hardwood species. In a specific sawlog management regime an effective pruning system is essential for high value wood production. Short rotations and rather low target diameters make it absolutely necessary to concentrate the inner knotty core to a very small region around the pith.

In southern Brazil a considerable area of eucalypt plantations are managed for high value sawlog production. Wider initial spacing, frequent thinnings and several pruning regimes are applied to guarantee high value wood production. The tree growers wanted to know the size of the knotty core that can be expected for the different genetic materials when a standardized management system is applied.

From these areas 3 genetic materials have been selected. E.grandis and E.dunnii from seeds as well as a cloned hybrid of E.saligna x E.grandis, all managed after the same system:

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